

# MODIFIED LAND SCURVY

WITH

## PINGÆMIA.

BY

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(Reprinted from the Indian Annals of Medical Science, No. XXIV.)

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CALCUTTA :

PRINTED AT THE BAPTIST MISSION PRESS.

1868.







*Scale 100 feet to an Inch*

SKETCH OF A BUSTEE

IN

AN EPIDEMIC

# MODIFIED LAND SCURVY

WITH

## PINGÆMIA.\*

BY

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In February 1867, a disease of a very singular nature first made its appearance in a bustee in Aheritollah Street, in the northern division of the town of Calcutta, and gradually so spread itself among the inhabitants of this particular locality as almost to assume an epidemic form.

As the spot of ground in which it prevailed is a very small and circumscribed one, and as the sources from which the epidemic emanated must have necessarily been confined to that neighbourhood, the subject demands great attention and careful enquiry. The symptoms in which this disease manifested itself are, indeed, of a very peculiar nature, and it is not very easy to attribute them with any amount of precision to any of the classes of pathological phenomena. A thorough investigation of them may, therefore, lead to the enlightenment of many a dark point in physics. Living as I have been in close vicinity to the locality, and having had the entire course of the epidemic, from its beginning to its end, under my own constant

\* From *pingo*, I paint, and *aima*, blood.

observation, I have ventured to make public the series of facts I collected, to enable the profession to trace out the real nature of the malady and its causes. Before proceeding to describe the predominating symptoms in which the disease showed itself, I will endeavour to give a brief but comprehensive sketch of the topography of the place. The annexed is a sketch plan of the centre of the outbreak and its neighbourhood.

It is accessible from the Aheritolah street by a narrow foot-path with a deep drain on one side and a row of squalid huts on the other. Now, looking at the main section of the plan, we find a cesspool of cowdung mixed with other liquid and solid animal excreta, indicated by the letter A:—it communicates with a ditch leading to the main drain. B is another cesspool of larger dimensions holding the same kind of matter. C, an open space of ground, is a repository of the sweepings of the locality, consisting of all kinds of animal and vegetable matter, either in a state of decomposition or fast approaching to it.

D is another exposed plot of ground covered with a luxurious bush of rank vegetation. E is the place where the refuse and sweepings from the surrounding huts have been accumulating for years. F is a row of cowsheds. G indicates the situation of the huts inhabited by persons who suffered from the disease now in question, whose cases will presently be described. H is a range of exposed private privies surrounding the ground. I is the smaller section of the public privies. The space K, immediately behind, is the place where the night-soil is gathered and deposited in open *gamlahs*, and the part of the ground sloping on to the drain running along side is covered all over with trails of liquid filth. L marks the course of a water passage, conveying the washings of the huts south of it, the people living therein using the water of the well marked L'.



M marks the course of the drain going round the ground, and N the site of a saltpetre manufactory, now no longer in operation.

The total area of the entire space is seventy-six cottahs, of which twenty-six cottahs are occupied by huts, nine cottahs by the tank, thirty-seven cottahs by open space, and four cottahs (or one-nineteenth of the entire area) by drains and cesspools.\*

On the North of the above drain are the plots of ground marked C and D, on its East are the privies of the houses dotted on its edge.

The hurricane of the 1st November, 1867, has wholly changed the aspect of the place above described, some of the cesspools in some cases have been filled up, some of the crowded huts have been swept off, so that a person visiting it now, will scarcely recognise it, but the change is immaterial, as the description given refers to the time when the disease prevailed.

I think it necessary to add that the sanitary condition of the locality before the outbreak of the epidemic was never better than what it was at the time of which we speak. The people tenanting the ground have been occupying it for some years, their occupation and modes of living have always been the same: the women earning their living by employment, either as domestic maid-servants or as char-women for sorting and cleaning grains and seeds in the godowns of the grain-dealers; the men were either gunny-bag sewers or gilders and hawkers.

There were altogether 16 huts, inhabited by 112 persons of all ages and sexes—each hut holding from 1 to 17 persons according to size. The number attacked by the disease was 74.

The condition of life of a great majority of the people re-

\* A cottah is 720 square feet or little above  $\frac{1}{16}$ th of an acre.

siding in the *bustee* is indigent, and, taking these days of high prices into consideration, it may be added that most of them were half-fed and ill-nourished, but such a state of affairs is not peculiar to this neighbourhood alone. The rice and other grain these people had to consume, were chiefly supplied from two of the neighbouring shops, and there was nothing perceptible in them which might lead to the suspicion that they contained any ingredients of a deleterious nature. The rice, indeed, was of a very coarse and inferior quality, but not worse than what is generally used by persons of the same class.

The water used by the inhabitants of this quarter for culinary and washing purposes, and sometimes for drinking also, was that of the tank higher up on the north of the drain last mentioned. The saltpetre manufactory above mentioned, marked N, was on the southern bank of the tank and on another spot adjoining there was a collection of Sulphuric Acid, which was evidently stored up for sale. Near the tank and close to the manufactory above alluded to, a fluid, which they called Easton's Boiler Fluid, was kept quite exposed to the rains for two seasons. The fluid has a greenish appearance, and on being evaporated, leaves a considerable amount of sediment, which consists of a large quantity of arsenic, with copper and lead in small proportions. It appears that a great portion of this solution must have found its way into the tank by being washed down by the rains.

The following is an analysis of the water of the tank.

In one gallon of 70,000 grains, this water contains:—

|  |       |
|--|-------|
| Total solids, .....                    | 32.69 |
| Volatile matter chiefly organic, ..... | 5.81  |
| Mineral matter, .....                  | 26.88 |



|   |          |
|---|----------|
| Earthy Salts, Silica, Oxide of Iron, insoluble in water, .....  | 17.99    |
| Carbonate of Lime,.....   | 12.60    |
| Carbonate of Magnesia, .....  | 4.89     |
| Silica, .....   | .50      |
| Salts soluble in the water, .....   | 8.89     |
| Chloride of Sodium, .....   | 6.70     |
| Sulphate of Soda, .....   | 2.19     |
| Ammonia, .....  | A trace. |
| Nitrate, .....  | A trace. |
| Grains of oxygen required for oxidation of readily oxidisable organic matter of 1000 grains of water, ..... | .0026    |
| Degrees of total hardness, .....  | 9.00     |
| Degrees of permanent hardness, .....  | 4.67     |
| Degrees of removeable hardness, .....   | 4.33     |

Several species of live animalcules were observed in the sediment of the water when examined under microscope after a week's settlement.

Nothing very peculiar was observed in the water; it contained all the ingredients of an ordinary tank water of inferior quality. The amount of the organic matter was not so large as to be condemned.

From the alleged contamination of the water of the tank by the "Easton's Boiler Fluid," arsenic, lead and copper were searched for, with negative result.

It may be observed that the fishes of the tank were palatable, before the contamination; after it they became less so.

One circumstance worthy of record in connection with this subject is, that those who left the place recovered, and on their return and after a few days' stay, contracted it again. Improved diet and regimen, along with the free use of lime juice, contributed to the mitigation of the disease.

It first broke out in a hut quite close to a dung-hole and a dirty cesspool. The first victims of the disease were a very poor and wretched woman, Monmoheenee, and one of her ragged tenants. These two persons were so much emaciated that they may naturally be supposed to have undergone real privation for a long time.

The epidemic spread from this spot all round and visited almost every one of the sixteen huts already described. It spared neither age nor sex; men, women, and children alike suffered from its effects.

The first symptom that attracted attention was a change of colour in the palms of the hands and soles of the feet, which assumed a leaden hue, and seemed as if they were rubbed with plumbago. The gradual darkening of the skin was generally very well marked, the papillæ becoming in most cases considerably prominent. The concomitant symptoms were emaciation, languor, loss of appetite, failure of strength and a constipated state of the bowels. The skin over the palms and soles was decidedly thickened and very tender to the touch. Most of the sick also suffered from cough, arising from a certain amount of bronchitis, and many also complained of tenderness on pressure over the liver. To explain these symptoms more fully, five of the most typical cases have been selected and a detail of previous history and present symptoms, as taken on the 24th September, 1867, is given below.

I. Monmoheence, a Hindoo widow, of the Baniah caste, aged 30, has been residing in the hut, where the disease first made its appearance, for upwards of 18 years. Besides her two children, she had two tenants living with her for a long time. Her condition of life has been very poor. She was in enjoyment of pretty good health till March, 1867, when she first noticed the colour of her hands and feet, specially the palms and soles, becoming dark. Notwithstanding the darkness of her general complexion, the blackening of the skin of these parts was very marked. She thought that she had contracted the disease from one of her tenants, who had been living in her house for more than 12 years, and who was the first to catch the infection. This tenant was a male, who was supposed to have leprosy and, his case being considered hopeless, he left the place two months afterwards. About a month after he was taken ill, this woman noticed the change in her own person, this local change of colour became associated with a burning sensation in the hands, feet and eyes; this used to become violent towards evening. From the beginning her strength had been failing, appetite getting more and more impaired and bowels sluggish; these symptoms became aggravated as the disease progressed. About four months later, she observed the breaking out of some white points in the affected parts, which, when examined by the naked eye, gave them a spotted appearance, being evidently due to raised papillæ. At about this time, she began to suffer from a slight cough, not attended with a free expectoration. The skin over the palms and soles had been thickened to a certain extent, and became very tender; since the development of the white points, her general complexion has become darker than usual.

*Present Symptoms.*—Very much emaciated, great prostration of strength, bad taste in the mouth, tongue moist and clean, no

relish for any article of food, appetite poor, conjunctivæ pale and rather yellowish, pulse small, soft and compressible, bowels confined, has pain on pressure over the right hypochondrium, cough troublesome. Expectoration scanty and consisting of frothy mucous. Percussion note of the chest clear ; no pain in any part of it. Mucous rales and sonorous *rhonchus*, audible all over, and more distinctly over the large bronchial tubes. This woman improved a little from generous food and administration of lime juice ; but died accidentally on the night of the 1st November, 1867, by the fall of her house, knocked down by the cyclone. We had an opportunity of getting a *post mortem* examination of her body at the Police Dead House attached to the Calcutta Medical College, through the kindness of the Police authorities and the Police Surgeon, Dr. Woodford. The following is an account of the autopsy. The lungs were found slightly engorged, especially at their posterior aspects and contained more than the usual quantity of pigmentary substance. Heart small, right side empty, left side contained a little dark fluid blood. Liver of normal size and consistence, mottled in appearance and of a livid colour. A section of it and also a portion of the skin of the hands and feet were removed and submitted for examination to Dr. C. Macnamara, who reports as follows :—

Specimens sent for examination. 1. A portion of the skin of the hands and feet ; and 2, a piece of the liver.

1. The vessels of the papillæ of the skin were in places closed by small masses of pigment, and the connective tissue around them was deeply pigmented, this character extended to the deeper layer of the epithelium, but not to the superficial layers. I have no doubt that the coloring matter above described was derived from the hæmatine of the blood, and this opinion was confirmed by the state of the liver.



2. A portion of the liver under the microscope exhibited distinct evidence of occlusion of some of its vessels, from small masses of pigmentary matter precisely similar to those noted in the skin. This condition was most evident towards the outer part (capsular) of the specimen sent me for examination. The tissues around these deposits were stained of a similar colour.

Portions of liver and skin were also subjected to chemical analysis with a view to discover the presence of arsenic, lead and copper, but the result was negative.\*

The two children of this woman had the same complaint, but of very recent origin. They fortunately escaped the accident and have since recovered.

II. Kalachand, an Ooryah, aged 32, who has been employed as a gardener, had been residing there the last time only for three months. He lived there previously for more than a year, and then went home, when he was absent for about eight months. On his return he was taken ill with fever accompanied with a considerable amount of coryza, severe headache, burning in the hands and feet, and bitter taste in the mouth. He had a very strong constitution when he first came back, but the fever having continued for more than a month, he was very much prostrated. A fortnight after he had the fever, he noticed a change of colour in his hands and feet, and more or less on the whole body. The palms and soles became at first uniformly black, afterwards became studded over with white points due to raised papillæ. The skin of these parts appeared swollen and was very tender, so much so that he could scarcely walk or handle his tools with ease. The lobes of his ears and also the

\* We wish that a minute examination of the Supra-renal capsules had been made.—EDS. IND. ANNALS.

alæ of his nose were thickened, and the change of colour was more or less distinctly marked all over his body. The white points were developed also. This man presented the external appearance of one suffering from fully developed tubercular leprosy. The symptoms observed on the day he was examined were great prostration of strength and emaciation of the body, tenderness in the right hypochondrium, loss of appetite, a small soft and easily compressible pulse, pale and dry tongue, costiveness, a slight cough with free expectoration of a thick viscid mucus. On a physical examination of the chest, the respiratory murmur was found natural, but somewhat dry and rough in character.

III. Nobin, a Hindoo of the Barber caste, aged 30, and by occupation a day-labourer, has been a resident of the neighbourhood for more than twenty-five years, and enjoyed ever since pretty good health. About a month and a half prior to the day of examination, he observed the change of colour in his own person, most distinctly marked in the hands and feet. His external appearance resembled very much that of the gardener, whose case has just been related. The concomitant symptoms were very much the same. General weakness, loss of appetite, burning in the hands, feet and eyes, bad taste in the mouth, coryza and cough, attended with scanty expectoration of frothy mucus, pain in the hepatic region and a harsh character of the respiratory sounds formed the category of symptoms.

IV. Sibehunder Roy, a Hindoo, *boistob*, aged 63, residing in the place since his birth, had been a gilder for 30 or 32 years, but had no work then. Generally he was of a strong, robust and healthy constitution. About three months before we saw him, he noticed some pain in the lower part of his chest, and the presence of a hard lump in the epigastrium. This hardness



gradually became diffused all over the abdomen, which swelled up also, and his bowels were confined. He attended the nearest charitable dispensary for a few days and took various medicines but without any benefit. About a fortnight later, he noticed some tenderness in the palms of his hands and soles of his feet which gradually became dark and a little swollen, the darkness in this man was uniform and very well marked in consequence of the fairness of his general complexion. A month previously he had epistaxis, but that got well of itself. For the last fifteen or sixteen days he had been taking warm milk with *ghee*, which had regulated his bowels, and by the external application of camphor and vinegar, the swelling and pain in his hands and feet had been getting less. The symptoms that were still very well marked were great weakness, loss of appetite, yellowish tint of conjunctivæ and a dry tongue coated with a yellow fur. There were no catarrhal symptoms in this case.

V. Dookhyram Pyne, a Hindoo of the Baniah caste, aged 32, and by occupation an artist, was born in the place and enjoyed generally good health. Two months and a half before we saw him, he observed the change of colour in his hands and feet, after having suffered for a few days from a burning sensation in those parts and profuse lachrymation. There were dark points all over his body. All the symptoms described in the other cases were present in him in the most aggravated form, but he got rid of them by removing to Serampore, whence he had returned only twenty days ago, and was already getting the disease again. His wife and child were also suffering from the effects of the malady.

Three out of these five cases, Nos. II. III. V. died within six months from the day the above notes were taken, the death of all was caused by dysentery.

From the nature of the disease, as manifested in the above five cases, and in all the others that we examined, and weighing the circumstances of the outbreak, we can venture to assert that some poison of an extraneous origin must have found access to the system, and having interfered in some way or other with the corpuscle-forming and destroying agencies, had set a certain amount of hæmatine free within the blood-vessels, and this had plugged the capillaries; or it may be, that the liver and other secreting organs had attempted to eliminate it from the body. That there was an excessive development of free pigment circulating throughout the system is evident from what we have already said, and the result of the microscopic examination, as reported by Dr. C. Maenamara, tends to prove that the pathological changes observed in this disease resemble in their main feature what Frerichs has described as taking place in pigment liver.

Now it remains to determine what this poison is and how it was produced. The circumstances that were common to all the persons have been already described. The question now arising is, how much the bad sanitation of the place had to do with the generation of the disease? Can it be ascribed to the free use of the water of the tank, an analysis of which I have given? Have any of the mineral ingredients of Easton's boiler fluid, which must, as we have said, have found its way into the tank, the power of producing the symptoms by having a gradual and slow access into the system?

It is not very easy to determine these points, and we leave all the facts that we were able to collect before the professional public to enable them to discover the true nature of the epidemic.

In conclusion I may mention that the spot where the epidemic in question broke out was visited, when the disease was in its height, by Dr. Ewart, Officiating Principal of the Calcutta Medical College and by Baboo Dwarkanath Mookerjee, House Physician of the Medical College Hospital, to the latter of whom I must acknowledge I am indebted for cooperation in conducting the investigation.

For the sketch of the ground I am indebted to the courtesy of Mr. C. Dissent, one of the Road Overseers of the Justices of the Peace for the Town of Calcutta, who took considerable pains in surveying the locality.



